Overview of the

National Fine Particulate Standard

Overview

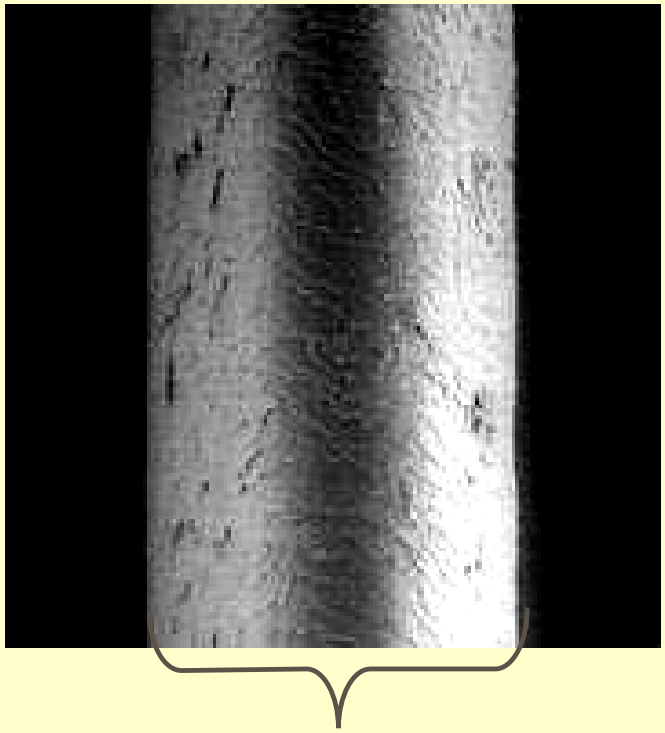
- EPA adopted the new fine particulate ($PM_{2.5}$) Standard in 1997.
- Presentation will describe:
  - Fine particles and sources of emissions
  - Health and environmental effects
  - Timing of the designation process

Fine Particle Standards

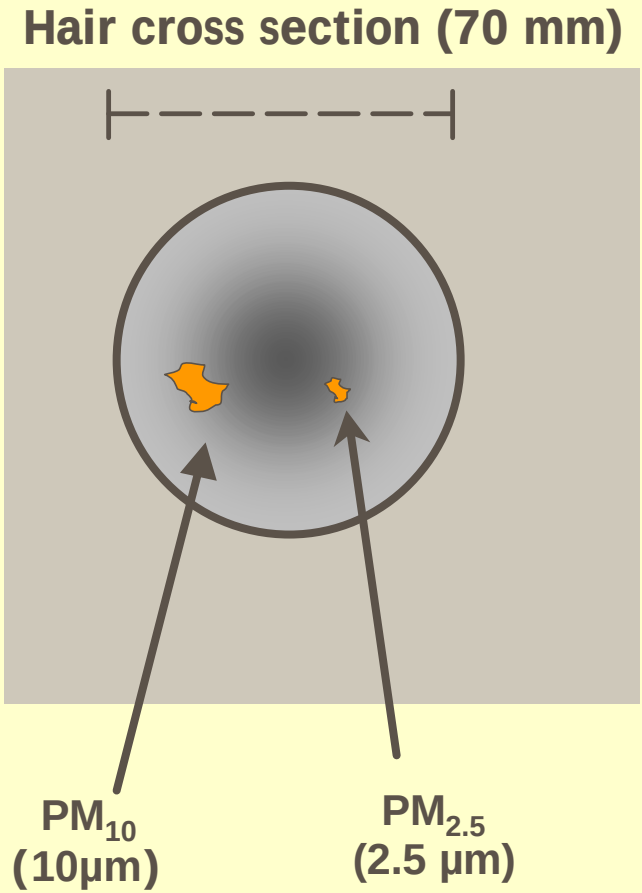
- National standards
  - Annual: 15 micrograms per cubic meter, averaged over 3 years
  - 24-hour: 65 micrograms per cubic meter, 98th percentile averaged over 3 years
- New standards withstood all legal challenges

Particulate Matter: What is It?

A complex mixture of extremely small particles and liquid droplets



Human Hair (70 µm diameter)



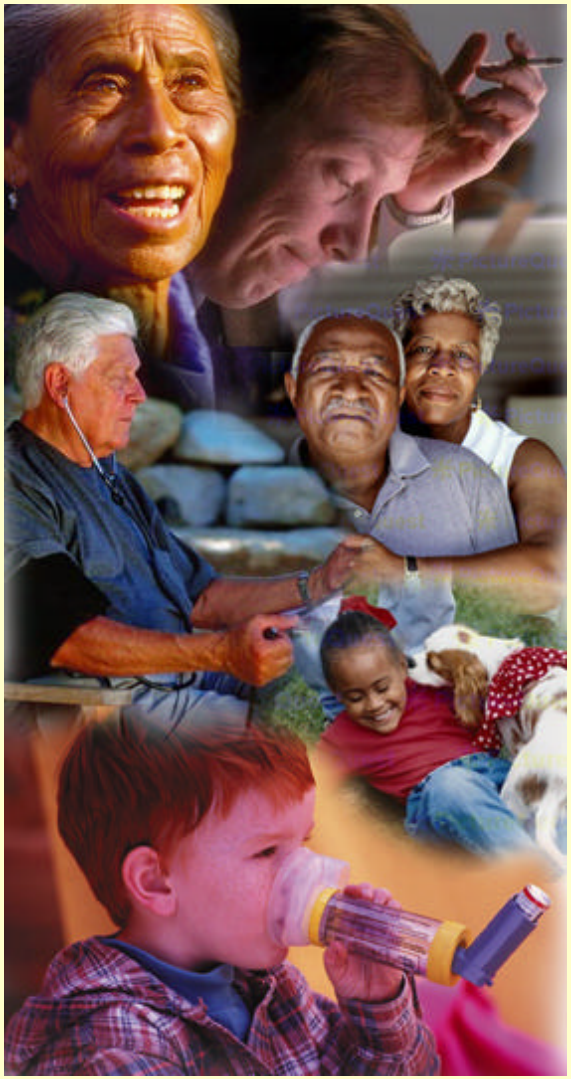
M. Lipsett, California Office of Environmental Health Hazard Assessment

Public Health Risks Are Significant

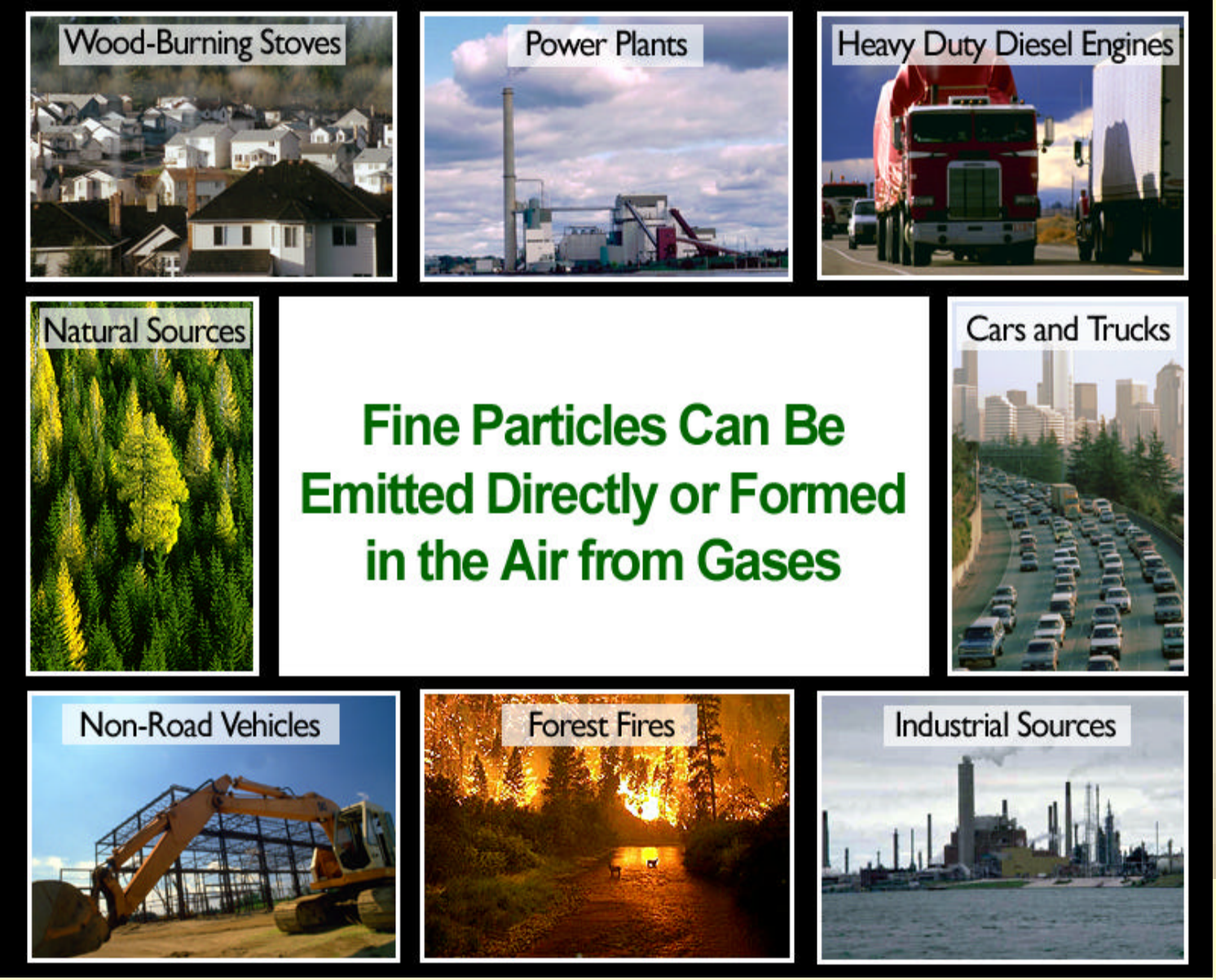
Particles are linked to:

- Premature death from heart and lung disease
- Aggravation of heart and lung diseases
  - Hospital admissions
  - Doctor and Emergency Room visits
  - Medication use
  - School and work absences
- Possibly linked to:
  - Lung cancer deaths
  - Infant mortality
  - Developmental problems, such as low birth weight, in children

Some Groups Are More at Risk



- People with heart or lung disease
  - Conditions make them vulnerable
- Older adults
  - Greater prevalence of heart and lung disease
- Children
  - More likely to be active
  - Breathe more air per pound
  - Bodies still developing



Formed from emissions of:

-- (SOx), sulfur oxides

-- (NOx), nitrogen oxides

-- (VOCs) volatile organic compounds

-- Ammonia

-- Chemically & physically diverse substances

-- Exist as liquid or solid particles

Fine Particles Reduce Visibility

- Example: Chicago in the summer of 2000.
  - Left – a clear day: PM 2.5 < 5 μg/m^3
  - Right – a hazy day: PM 2.5 ~ 35 μg/m^3

Monitoring for $PM_{2.5}$

- FRM – Federal Reference Method
  - 19 counties monitored
  - Monitors 24hr/3 day or 24hr/6 day schedule
- TEOM – Tapered Element Oscillating Microbalance
  - 4 counties now - additional 6 to be located
  - continuous hourly readings averaged over 24-hours
  - Hourly averages vs 24 hour average
  - Cannot be used for NAAQS determination
  - Will be used for reporting $PM_{2.5}$ to Air Quality Index and Air Quality Mapping/Forecasting

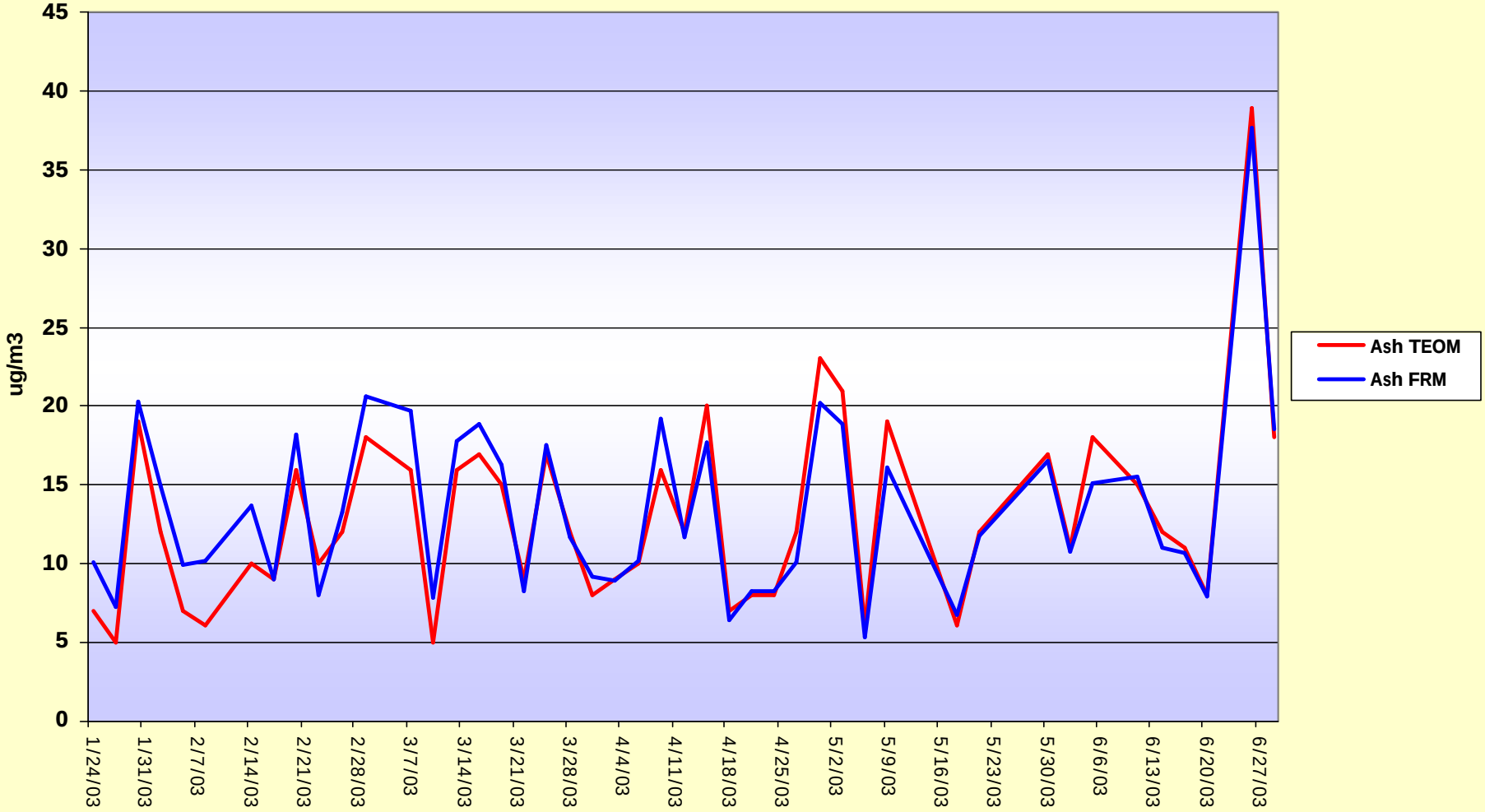
Monitoring for PM2.5 (continued)

- Speciation Monitors
  - 8 counties – typically major metro areas
  - Monitors 24hr/6 days
  - Used to determine chemical makeup of fine particulate
  - Part of the sequential monitoring system
    - Determine how well the FRM monitors are performing
    - constituency of the samples
  - Analysis performed by private lab thru EPA contract
    - 59 measurements including mass, nitrates, sulfates, ammonium, 3 types of carbon and 48 metals.

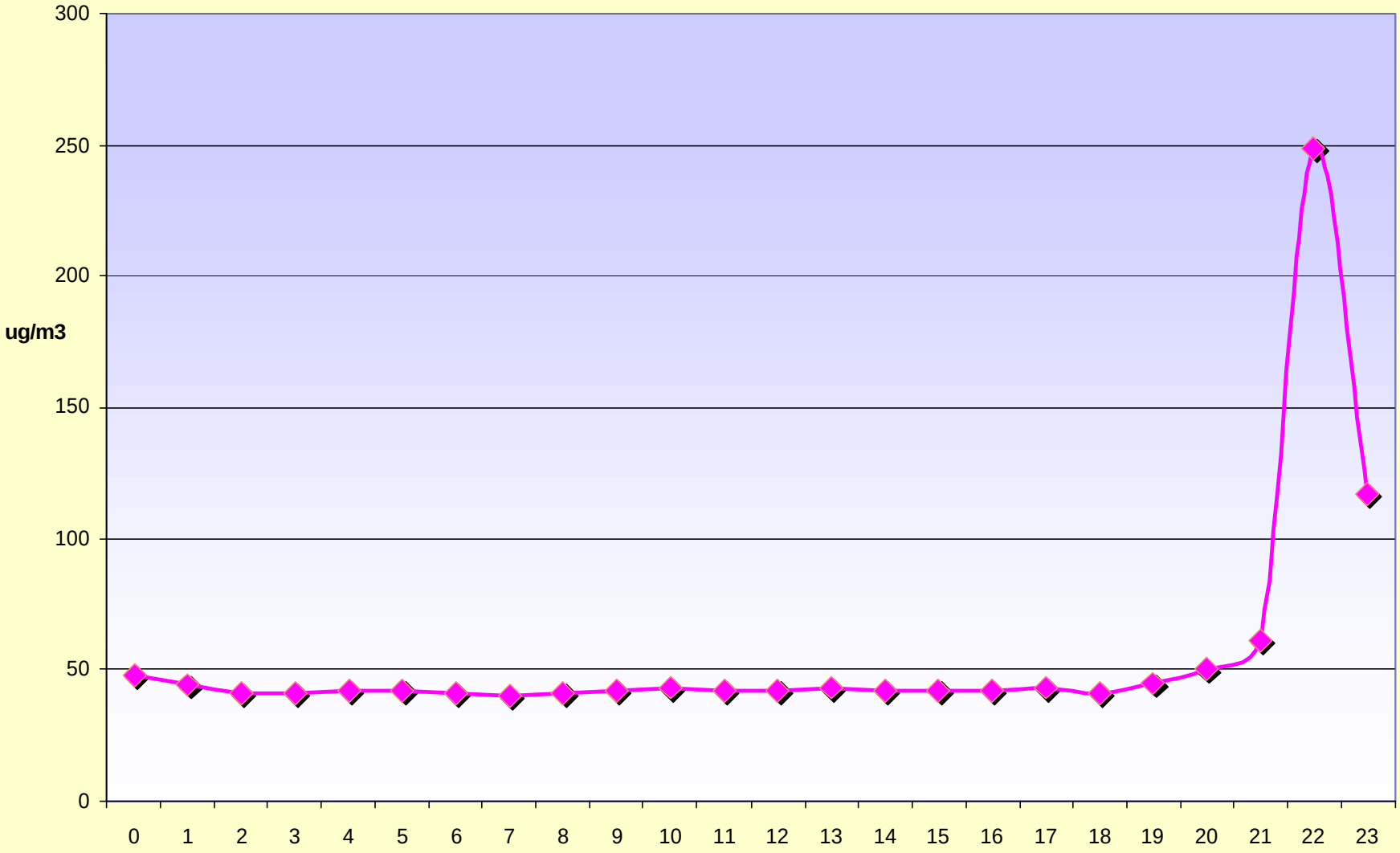
Ashland Site

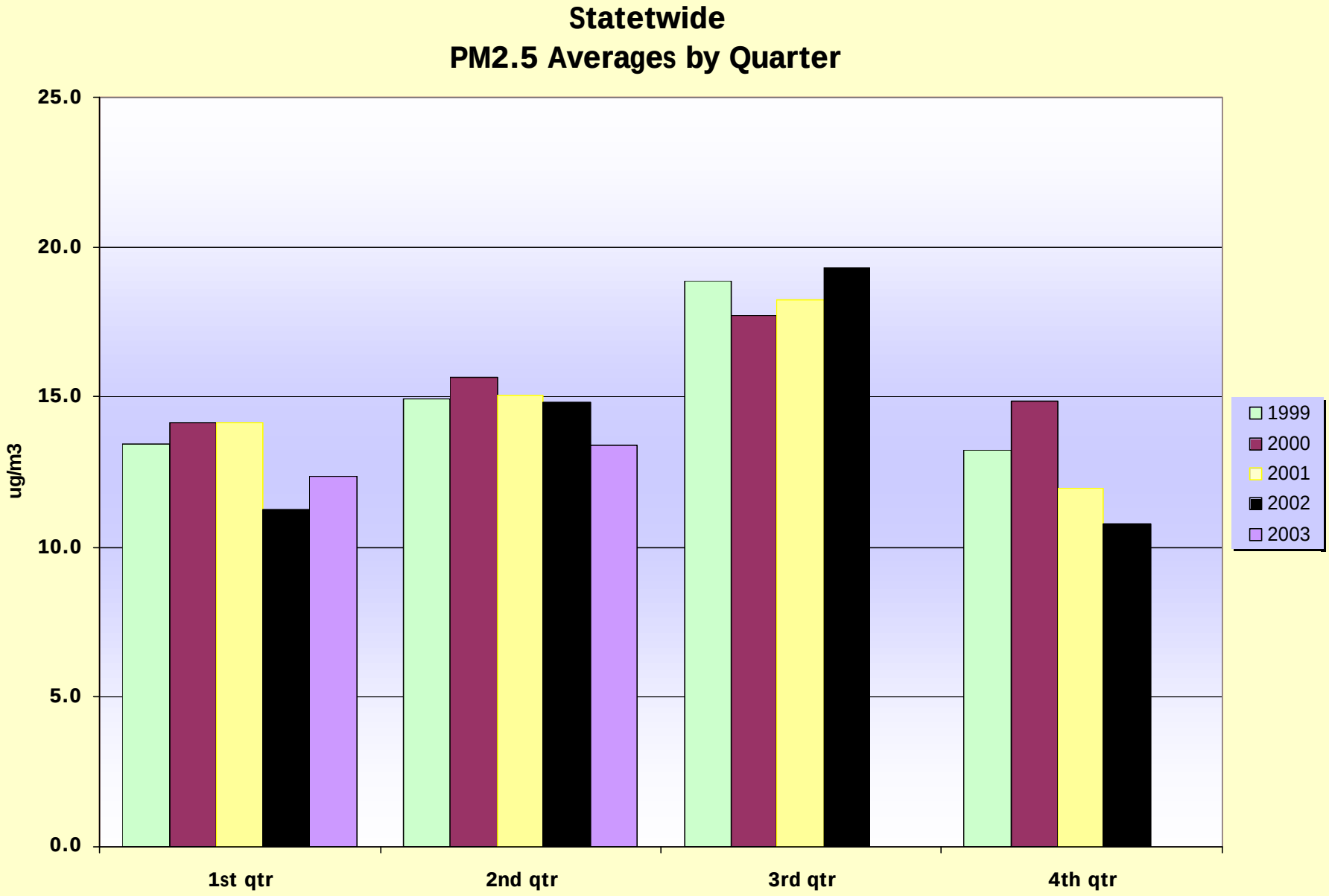
PM2.5 FRM vs TEOM

January 24, 03 thru June 27, 03



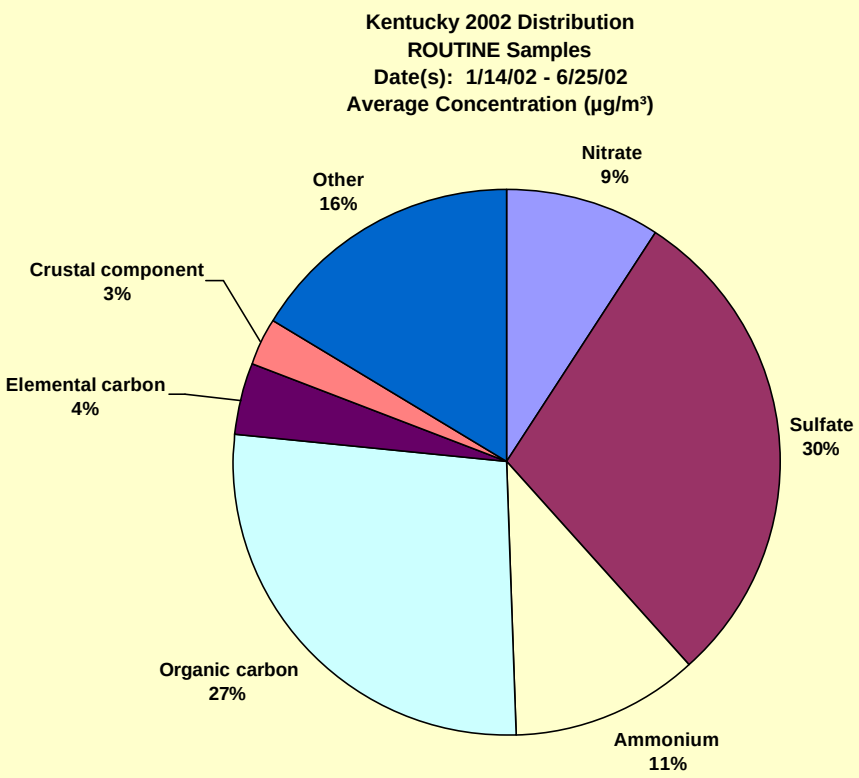
Ashland TEOM Chart
July 4, 2003

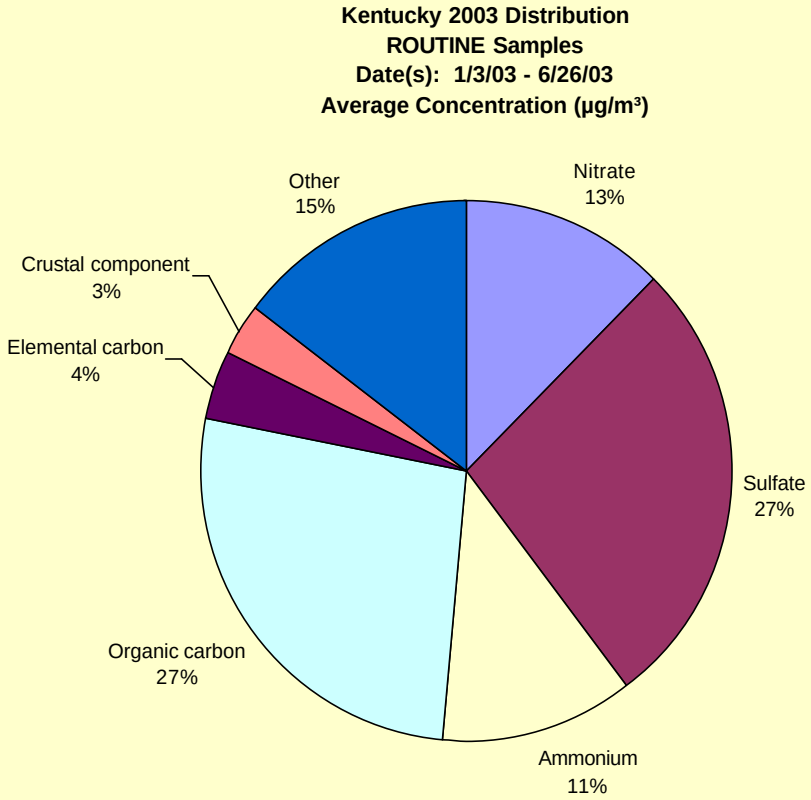



Statetwide
PM2.5 Averages by Quarter
25.0
20.0
15.0
10.0
5.0
0.0
ug/m3
1st qtr
2nd qtr
3rd qtr
4th qtr
1999
2000
2001
2002
2003

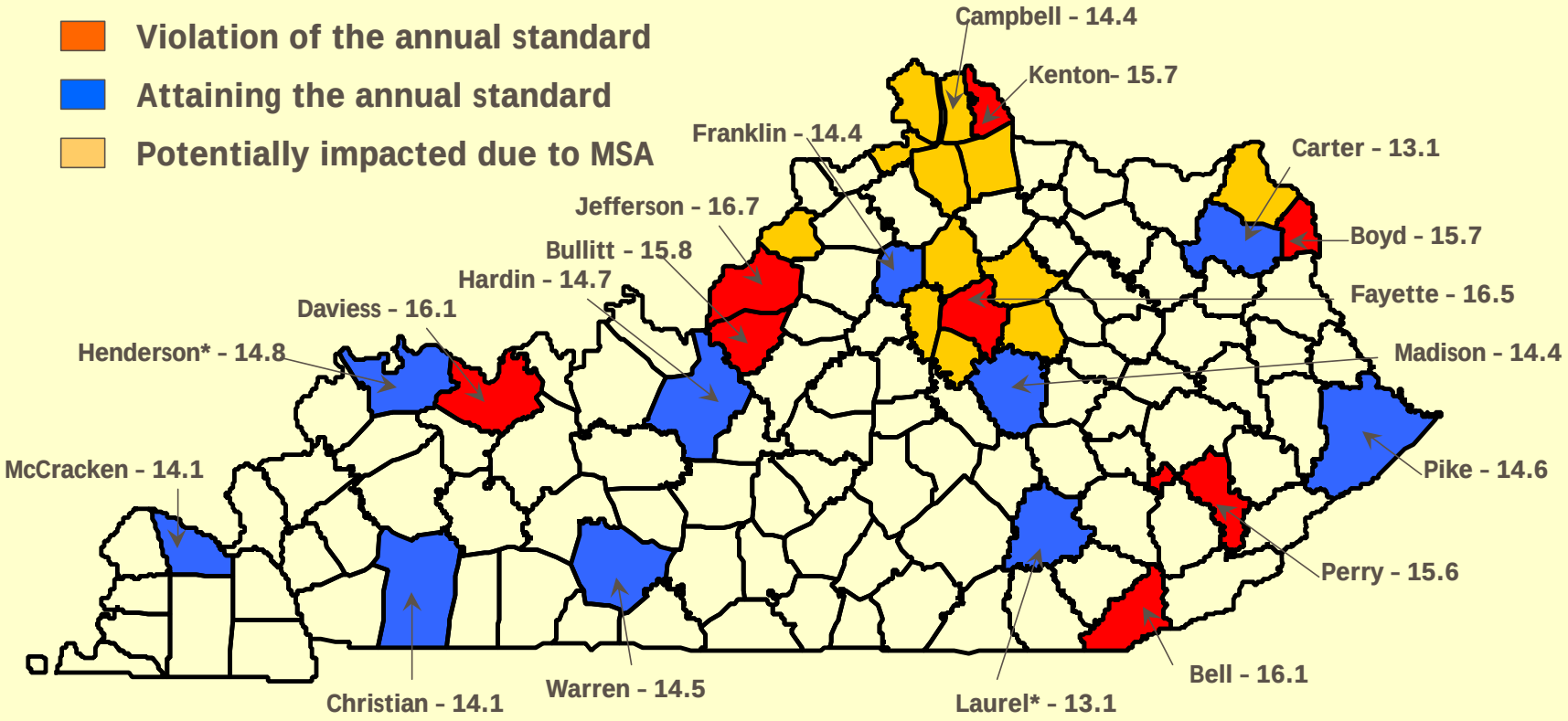
$PM_{2.5}$ Speciation Data Comparison

2002 to 2003





PM2.5 Monitored Values in Kentucky 2000-2002



PM2.5 NAAQS
Schedule for Implementation

- April 1, 2003: EPA issued designation guidance
- Winter 03/04- Propose rulemaking on the implementation approach
- February 15, 2004 - States/Tribes to submit recommended designations
- July 2004: EPA issues preliminary list of areas, allowing 120 days for comments on modifications
  - Opportunity to update recommendations based on 2001-2003 data

PM2.5 NAAQS
Schedule for Implementation cont'd

- September 2004 – Finalize rulemaking on the implementation approach
- December 15, 2004 – EPA will promulgate air quality designations
- December 2007 – State Implementation Plans to U.S. EPA
- Attainment dates ranging from 2009-2014 (depending on the severity of the problem)

Summary

- Fine particles contribute to significant health and environmental effects.
- States to submit recommendations for their areas to EPA in February 2004.
- EPA intends to finalize the designations for the fine particle standards in December 2004.
- SIP submittals due three years later-- December 2007.